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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/868,716	06/20/2001	Jurgen Beyerer	34691/234885	3478

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EXAMINER

YAM, STEPHEN K

ART UNIT	PAPER NUMBER
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2878

DATE MAILED: 03/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 09/868,716	Applicant(s) BEYERER ET AL.	
	Examiner Stephen Yam	Art Unit 2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 November 2003.
 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 30-34, 36-40, 42 and 45-47 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) ☐ Claim(s) _____ is/are allowed.
 6) ☒ Claim(s) 30-34, 36-40, 42 and 45-47 is/are rejected.
 7) ☐ Claim(s) _____ is/are objected to.
 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This action is in response to Amendments and remarks filed on November 24, 2003. Claims 30-34, 36-40, 42, and 45-47 are currently pending.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 30-34, 42, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tabatabaei US Patent No. 5,757,506 in view of Pöhlandt US Patent No. 5,996,681.

Regarding Claims 30, 31, 33, 34, 42, and 45, Tabatabaei teaches (see Fig. 1) a method of detecting defects on molds used in the foundry industry (see Col. 1, lines 8-13 and 15-17) comprising illuminating (18) each mold by at least two light sources (18) from different directions and so as to produce shadows (see Col. 2, lines 44-46) which magnify an area of each mold, recording by means of a camera (10) each illuminated mold and the shadows resulting from the illumination (see Col. 2, lines 44-46 and Col. 4, lines 25-30) to thereby produce recorded data which comprise a recorded image (see Col. 2, lines 47-62), and processing the recorded data in a computer (22) and including processing the recorded image by comparing the recorded image with a record of reference data (see Col. 2, lines 65-67 and Col. 4, lines 12-23). Tabatabaei also teaches the shadows as clearly defined and distinguishing (see Col. 4, lines 25-30)- therefore, inherently, the shadows are a magnification of the notch so that it is clearly

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detected. Regarding Claim 31, Tabatabaei teaches (see Fig. 1) the camera arranged at a fixed location. Regarding Claim 33, Tabatabaei teaches (see Fig. 1) the processing step including exchanging signals (see Col. 3, lines 3-10) between the computer and a stored program control (26). Regarding Claim 34, Tabatabaei teaches (see Col. 2, lines 61-67) the further step of performing a qualitative or quantitative image evaluation on the recorded image. Regarding Claim 42, Tabatabaei teaches the image processing step comprising a defect detection (see Col. 4, lines 66-65). Regarding Claim 45, Tabatabaei also teaches the processing step further includes a brightness adjustment (see Col. 5, lines 29-34) for adapting the gray-scale values of the image. Tabatabaei does not teach detecting defects in shot cores or core packets. Pöhlandt teaches (see Fig. 1) a method for detecting defects in a shot core (3) or core packet in the foundry industry by capturing (5) and analyzing (6) an image. It would have been obvious to one of ordinary skill in the art at the time the invention was made to detect defects in a shot core or core packet as taught by Pöhlandt in the method of Tabatabaei, to provide non-contacting defect detection and scanning for quality control in shot cores/core packets, as taught by Pöhlandt (see Col. 4, lines 65-67).

Regarding Claim 32, Tabatabaei in view of Pöhlandt teach the method in Claim 30, according to the appropriate paragraph above. Tabatabaei and Pöhlandt do not teach the camera including a lens and the camera encased at least in the region of the lens. It is well known in the art that a camera includes a lens to properly focus an image onto an internal imaging element and is encased to protect the imaging element from receiving external light. It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a lens in the camera and to encase the camera at least in the region of the lens in the method of Tabatabaei

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in view of Pöhlandt, to properly receive images on the camera and prevent external light from adversely affecting the imaging on the camera.

3. Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tabatabaei in view of Pöhlandt as applied to Claim 30, further in view of Sacks et al. US Patent No. 4,736,437.

Tabatabaei in view of Pöhlandt teach the method in Claim 30, according to the appropriate paragraph above. Tabatabaei and Pöhlandt do not teach the comparing step including a coarse correlation with the recording data. Sacks et al. teach an image processing method with processing a recorded image from recorded data and comparing it with a record of reference data (see Col. 1, lines 9-13 and Col. 2, lines 60-63), wherein the comparing includes a coarse correlation with the recording data (see Col. 1, lines 43-56 and Col. 4, lines 30-35). It would have been obvious to one of ordinary skill in the art at the time the invention was made to include a coarse correlation with the recording data as taught by Sacks et al. in the method of Tabatabaei in view of Pöhlandt, to reduce processing time and provide a high-speed and accurate comparison as taught by Sacks et al. (see Col. 1, lines 9-13 and 21-25).

4. Claims 37-40, 46, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tabatabaei in view of Pöhlandt as applied to Claim 30, further in view of Raviv US Patent No. 4,873,651.

Regarding Claims 37-40, Tabatabaei in view of Pöhlandt teach the method in Claim 30, according to the appropriate paragraph above. Regarding Claim 38, Tabatabaei teaches the image processing step including a position correction (see Col. 3, lines 1-13). Regarding Claim

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39, Tabatabaei teaches the position correction including recording reference marks ("notch"- see Col. 3, lines 1-13 and Col. 4, lines 17-23). Regarding Claim 40, Tabatabaei teaches the reference marks as lines and/or dots (see Col. 2, lines 29-31) on a base (side of (16)). Tabatabaei and

Pöhlandt do not teach the recording step including recording at least two images which are processed in the processing step. Raviv teaches (see Fig. 1B) a method for imaging the surface of an object (1) comprising illuminating the object by at least two light sources (6) from different directions so as to produce shadows (see Fig. 1A and Col. 2, lines 40-52), recording by means of a camera (3) each object and the shadows resulting from the illumination to produce recorded data which comprise a recorded image (see Col. 5, lines 56-58 and Col. 6, lines 4-7), and processing the recorded data in a computer (4), wherein the recording step includes recording at least two images which are processed in the processing step (see Col. 5, lines 9-13 and 17-20 and Col. 6, lines 1-7). It would have been obvious to one of ordinary skill in the art at the time the invention was made to record at least two images which are processed in the processing step as taught by Raviv in the method of Tabatabaei in view of Pöhlandt, to produce multiple shadow images to obtain different shadow projections to provide improved detection of the notch.

Regarding Claim 46, Tabatabaei in view of Pöhlandt teach the method in Claim 30, according to the appropriate paragraph above. Tabatabaei and Pöhlandt do not teach the at least two light sources operated in sequence. Raviv teaches (see Fig. 1B) a method for imaging the surface of an object (1) comprising illuminating the object by at least two light sources (6) from different directions so as to produce shadows (see Fig. 1A and Col. 2, lines 40-52), recording by means of a camera (3) each object and the shadows resulting from the illumination to produce recorded data which comprise a recorded image (see Col. 5, lines 56-58 and Col. 6, lines 4-7),

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and processing the recorded data in a computer (4), wherein the at least two light sources are operated in sequence (see Col. 2, lines 58-64 and Col. 6, lines 1-7). It would have been obvious to one of ordinary skill in the art at the time the invention was made to operate the two light sources in sequence as taught by Raviv in the method of Tabatabaei in view of Pöhlandt, to produce multiple shadow images to obtain different shadow projections to provide improved detection of the notch.

Regarding Claim 47, Tabatabaei in view of Pöhlandt teach the method in Claim 30, according to the appropriate paragraph above. Tabatabaei and Pöhlandt do not teach the at least two light sources operated with color differentiation. Raviv teaches (see Fig. 1B) a method for imaging the surface of an object (1) comprising illuminating the object by at least two light sources (6) from different directions so as to produce shadows (see Fig. 1A and Col. 2, lines 40-52), recording by means of a camera (3) each object and the shadows resulting from the illumination to produce recorded data which comprise a recorded image (see Col. 5, lines 56-58 and Col. 6, lines 4-7), and processing the recorded data in a computer (4), wherein the at least two light sources are operated with color differentiation (see Col. 8, lines 33-37). It would have been obvious to one of ordinary skill in the art at the time the invention was made to operate the two light sources with color differentiation as taught by Raviv in the method of Tabatabaei in view of Pöhlandt, to obtain and record multiple shadow projections simultaneously, as taught by Raviv (see Col. 8, lines 33-37).

Response to Arguments

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5. Applicant's arguments filed November 24, 2003 have been fully considered but they are not persuasive.

Applicant argues that there is no suggestion as to why a revision of the mold positioning system of Tabatabaei to incorporate the teachings of Pöhlandt would be desirable. Examiner asserts that Tabatabaei teaches the invention for a foundry casting operation (see Col. 1, lines 15-16) and a foundry is used to construct numerous different parts, depending on the appropriate mold. Pöhlandt further teaches that shot cores are constructed in a similar foundry system (see Col. 1, lines 12-20) using a mold/core packet and that similar concerns regarding correct production of shot cores or core packets are shared. Therefore, it is obvious to one of ordinary skill in the art to use the system of Tabatabaei to use core packets as molds for creating shot cores as Pöhlandt teaches, and to utilize the system of Tabatabaei to detect defects in molds/core packets (see Col. 4, lines 55-59).

Applicant further argues that the shadows as disclosed by Tabatabaei are not magnifying an area of an article. Examiner asserts that the shadow enlarges the edge and depth of the notch as viewed by image sensor (10) in Fig. 1, since the light sources are placed at an oblique angle to cast the shadow of the edge of the notch onto the bottom surface of the notch. Since the shadow is clearly defined and distinguishing (see Col. 4, lines 25-30), it is imaged and used as a measurement tool for alignment and defect detection.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Yam whose telephone number is (571)272-2449. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571)272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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JIANH X. LUU
PATENT EXAMINER